QUICK INSTALLATION GUIDE

A1-ESS-G2 SYSTEM

SolaX Power Network Technology (Zhejiang) Co., Ltd.

Add: No.288,Shizhu Road, Tonglu Economic Development Zone, Tonglu City,
Zhejiang Province, 310000 P. R. CHINA
Tel: +86 (0) 571-5626 0011
E-mail: info@solaxpower.com

320102036407

www.solaxpower.com

CHANGE HISTORY

Changes between document versions are cumulative. The latest version contains all updates made in previous versions.

Version 07 (Jun 12, 2023)

Modified battery installation

Version 06 (May 06, 2023)

Modified battery accessory description

Version 05 (Mar. 24, 2023)

Modified the size, added instruction of drilling hole in the back

Version 04 (Dec. 29, 2022)

Added weight and mounting height instructions

Version 03 (Sep. 29, 2022)

Updated torque, breaker information

Version 02 (May 31, 2022)

Updated torque, modified equipment drawings, etc.

Version 01 (May 31, 2022)

Modified the installation method

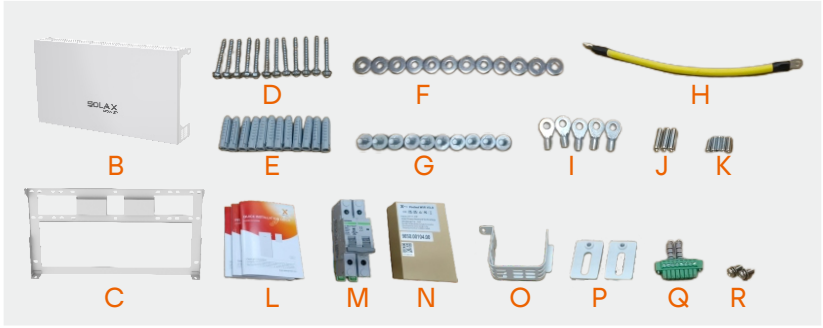
Version 00(Oct. 22, 2021)

Initial release

1. Packing List

- Packing list of inverter

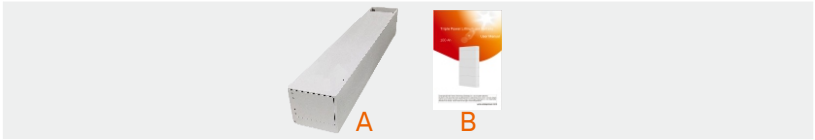
A



Item	Name	Description
A	Inverter X1	Product
B	Mental cover X1	Protect the inverter
C	Bracket X1	Support the inverter
D	Self-tapping screwX12	Fix the bracket
E	Expansion boltX12	Fix the bracket
F	WasherX12	Fix the bracket
G	M5X10 screwX10	Fix the cover, cable protective guard and cover fixing plate
H	Grounding terminalX5	For grounding
I	PE cableX1	Grounding cable between inverter and BMS
J	8 AWG ferrules X3	For AC cable
K	10 AWG ferrules X6	For PV cable
L	DocumentsX3	User manual, installation guide and quick installation guide
M	Circuit breakerX1	Mount it on the BI
N	Communication dongleX1 (Optional)	For communication
O	Cable protective guardX1	Protect the cable between inverter and BMS
P	Fixing plate of coverX2	Connect the cover and the bracket
Q	8-pin female terminal block with terminating resistorX1	Additional 8-pin female terminal block with terminating resistor
R	M4X10 screwX2	Fix the fixing plate between inverter bracket and BMS

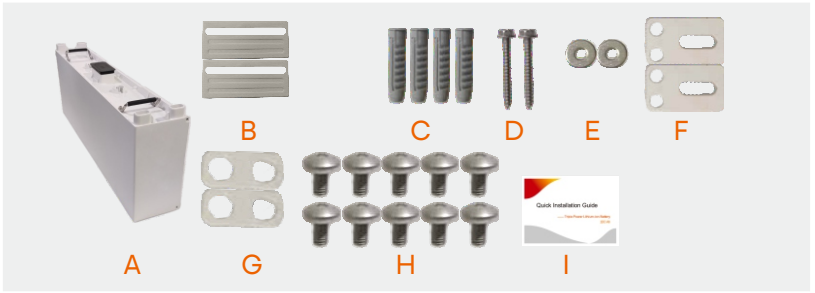
- Packing list of battery

BMS (TBMS-MCS60060)



Item	Name and Quantity	Description
A	BMS	Product
B	User ManualX1	Guide the installation and maintenance

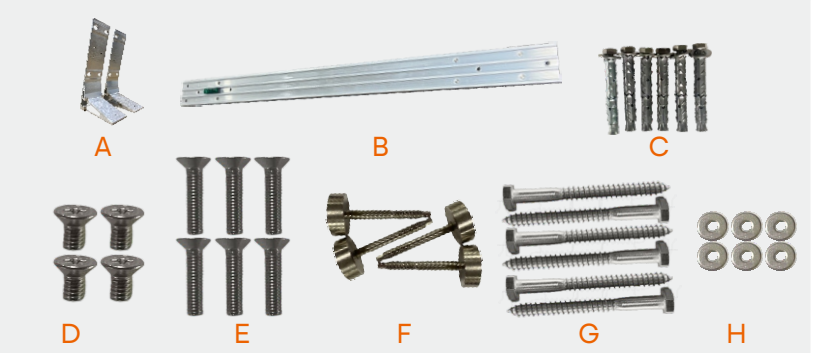
OneBattery Module (TP-HS50×1):



Item	Name and Quantity	Description
A	Battery moduleX1	Product
B	BracketX2	Support battery module to be mounted on the wall
C	Expansion boltX4	Fix the bracket
D	Expansion boltX2	Fix the bracket
E	WasherX2	Fix the bracket
F	Fixing plate (3 holes)X2	Connect two battery modules with bracket
G	Fixing plate (2 holes)X2	Connect two battery modules
H	M5*10 cross screwX10	Fix the fixing plate
I	Quick Installation GuideX1	Guide the installation

NOTE!
The above-mentioned accessories are only for one battery module.

Accessories for Both Floor and Wall Mounting (Separate Accessory Box)



Item	Name and Quantity	Description
A	Base supportX2	Support the base
B	Transverse plateX1	Support the base
C	Expansion screwX6	Fix the base support in case of concrete wall
D	M5*8 countersunk screwX4	Fix the transverse plate with base support
E	M5*20 countersunk screwX6	Fix the two sides of base
F	Adjustment screwX2	Adjust the base to be leveled
G	Self-tapping screwX6	Fix the base support in case of wooden wall
H	WasherX6	Fix the base support in case of wooden wall

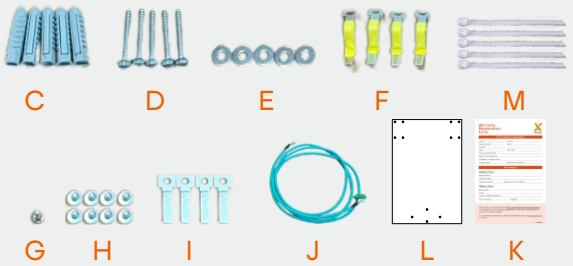
Base for Battery:

Item	Name and Quantity	Description
/	Base	Product

- Packing list of BI

A

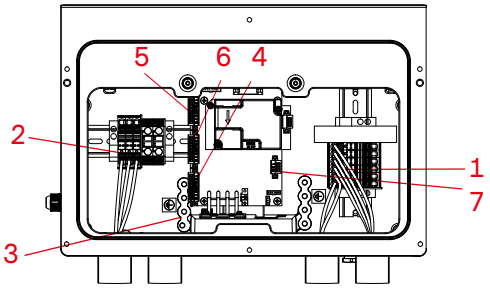
B



Item	Name and Quantity	Description
A	Backup inteface X1	Product
B	Bracket X1	Support the BI to be mounted on the wall
C	Expansion bolt X5	Four for fixing the bracket and one for fixing the BI
D	Self-tapping screw X5	Four for fixing the bracket and one for fixing the BI
E	Washer X5	Four for fixing the bracket and one for fixing the BI
F	55*13*23.7mm Copper bar X4	For parallel connection with inverter
G	M4*12 cross screw X1	Fix the circuit breaker
H	M5*12 cross screw X8	Fix the part when parallel connection with inverter
I	40*13*7.9mm Copper bar X4	For parallel connection with inverter
J	Communication cable X1	Communicate with inverter
K	Warranty card X1	For warranty registration
L	Punching reference paper X1	For hole location
M	Cable tie X5	Fix the cable

2. Overview of Terminals

- Terminals and breaker of inverter



Inverter power terminal (Purchased by customer)

No.	Terminals	Type	Cross-sectional Area Range	Strip Length
1	PV terminals	90°C(194°F), 600 V, copper	10-8 AWG	0.47 in / 12 mm
2	AC terminals	90°C(194°F), 600 V, copper	12-8 AWG (3.8KW), 10-8 AWG (5/6/7.6KW)	0.47 in / 12 mm
3	Ground terminals	90°C(194°F), 600 V, copper	8 AWG	0.47 in / 12 mm

Inverter communication terminal (Purchased by customer)

No.	Terminals	Port Pin	Type	Range	Strip Length	Torque (in-lbs)
4	AUX terminal	Pin 1: RS485_METER_A	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: RS485_METER_B				
		Pin 3: GND				
		Pin 4: +12V_RELAY_OUT				
		Pin 5: DRM0				
		Pin 6: +12V_COM				
		Pin 7: STOP_NO+				
		Pin 8: STOP_NO-				

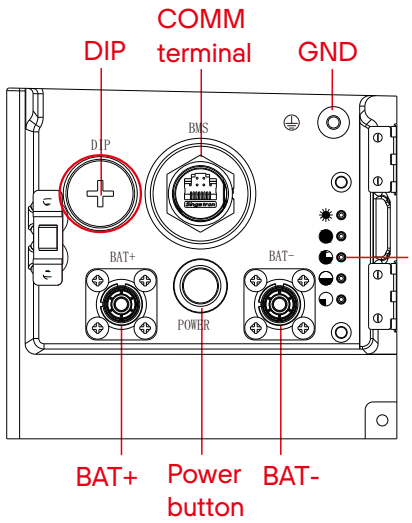
Inverter communication terminal (Purchased by customer)

No.	Terminals	Port Pin	Type	Range	Strip Length	Torque (in-lbs)
5	COMM in terminal	Pin 1: SYSR_L	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: SYSR_H				
		Pin 3: CAN_L				
		Pin 4: CAN_H				
		Pin 5: RS485_BI_A				
		Pin 6: RS485_BI_B				
		Pin 7: +12V		18-16 AWG		
		Pin 8: GND				
6	COMM out terminal	Pin 1: SYSR_L	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: SYSR_H				
		Pin 3: CAN_L				
		Pin 4: CAN_H				
		Pin 5: RS485_BI_A				
		Pin 6: RS485_BI_B				
		Pin 7: +12V		18-16 AWG		
		Pin 8: GND				
7	MLPE terminal	Pin 1: GND	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: RS485_MLPE_A				
		Pin 3: RS485_MLPE_B				

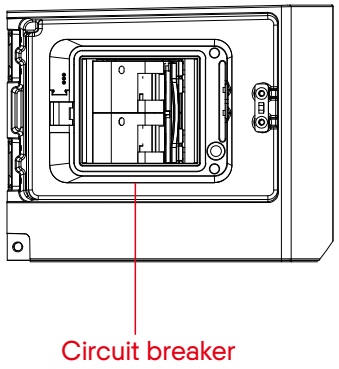
Inverter breaker and switch

No.	Component	Description	Source
1	AC Breaker	3.8 KW: Noark # B1N2C20: 20 A Circuit Breaker; 2-Pole, 240 V, 10 kAIC 5 KW: Noark # B1N2C30: 30 A Circuit Breaker; 2-Pole, 240 V, 10 kAIC 6 KW: Noark # B1N2C35: 35 A Circuit Breaker; 2-Pole, 240 V, 10 kAIC 7.6 KW: Noark # B1N2C40: 40 A Circuit Breaker; 2-Pole, 240 V, 10k AIC	Can be purchased from the manufacturer
2	Emergency stop switch	Normally closed (NC) contact The UL certification is required for the emergency stop switch.	Purchase by customer

- Terminals breaker of battery

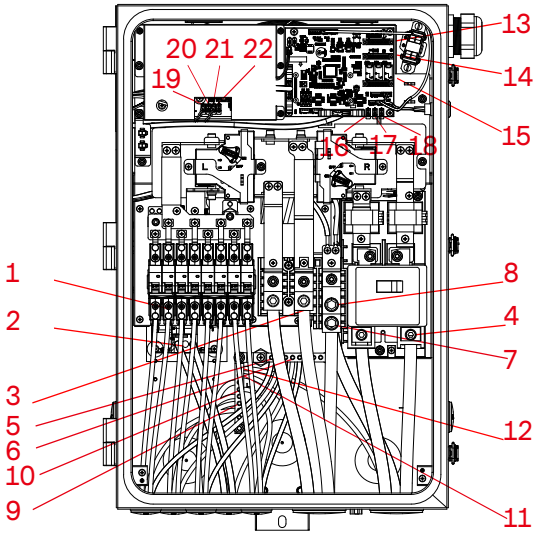


Right side view



Left side view

- Terminals breaker of BI



BI power terminal (Purchased by customer)

No.	Terminals	Cross-sectional Area Range	Strip Length	Torque (in-lbs)
1	INV terminals	12-8 AWG (3.8 KW), 10-8 AWG (5/6/7.6 KW)	0.67 in / 17 mm	30
2	GEN terminals	8-4 AWG	0.67 in / 17 mm	/
3	Load terminals	3 AWG-4/0 AWG	1.25 in / 32 mm	275
4	Grid terminals	3 AWG-4/0 AWG	1.25 in / 32 mm	275
5	INV Neutral terminals	12-8 AWG (3.8 KW), 10-8 AWG (5/6/7.6 KW)	0.79 in / 20 mm	275
6	GEN Neutral terminals	8-4 AWG	0.79 in / 20 mm	/
7	Load Neutral terminals	3 AWG-4/0 AWG	1.77 in / 45 mm	275
8	Main Neutral terminals	3 AWG-4/0 AWG	1.77 in / 45 mm	275
9	INV Ground terminals	8 AWG	0.79 in / 20 mm	30
10	GEN Ground terminals	8-6 AWG	0.79 in / 20 mm	30
11	Load Ground terminals	6-4 AWG	1.77 in / 45 mm	30
12	Main Ground terminals	6-4 AWG	1.77 in / 45 mm	30

* The type of BI power cable shall be 90°C(194°F), 600 V, copper.

BI communication terminal (Purchased by customer)

No.	Terminals	Port Pin	Type	Range	Strip Length	Torque (in-lbs)
13	INV Communication terminal	Pin 1: RESERVE	CAT5 or better	24-18 AWG	0.24 in / 6 mm	1.8
		Pin 2: RESERVE				
		Pin 3: CAN_L				
		Pin 4: CAN_H				
		Pin 5: RS485_BI_A				
		Pin 6: RS485_BI_B				
		Pin 7: +12 V		18-16 AWG		
		Pin 8: GND				
14	AUX1 terminal	Pin 1: DRY_GEN		24-16 AWG	0.24 in / 6 mm	1.8
		Pin 2: GEND_GEN				
		Pin 3: RS485_RESERVE_A	CAT5 or better	24-18 AWG		
		Pin 4: RS485_RESERVE_B				
		Pin 5: RESERVE				
		Pin 6: RESERVE				
		Pin 7: STOP_NO+				
		Pin 8: STOP_NO-				
15	AUX2terminal	Pin 1: NO_1		24-16 AWG	0.24 in / 6 mm	1.8
		Pin 2: COM_1				
		Pin 3: NC_1				
		Pin 4: NO_2				
		Pin 5: CON_2/3				
		Pin 6: NC_2				
		Pin 7: NO_3				
		Pin 8: NC_3				
16	CT1 terminal	Pin 1: CT1+	Shielded, twisted pair	/	/	/
		Pin 2: CT1-				
17	CT2 terminal	Pin 1: CT2+	Shielded, twisted pair	/	/	/
		Pin 2: CT2-				
18	CT3 terminal	Pin 1: CT3+	Shielded, twisted pair	/	/	/
		Pin 2: CT3-				
19	CT L1A terminal	Pin 1: CT L1A+	Shielded, twisted pair	/	/	/
		Pin 2: CT L1A-				

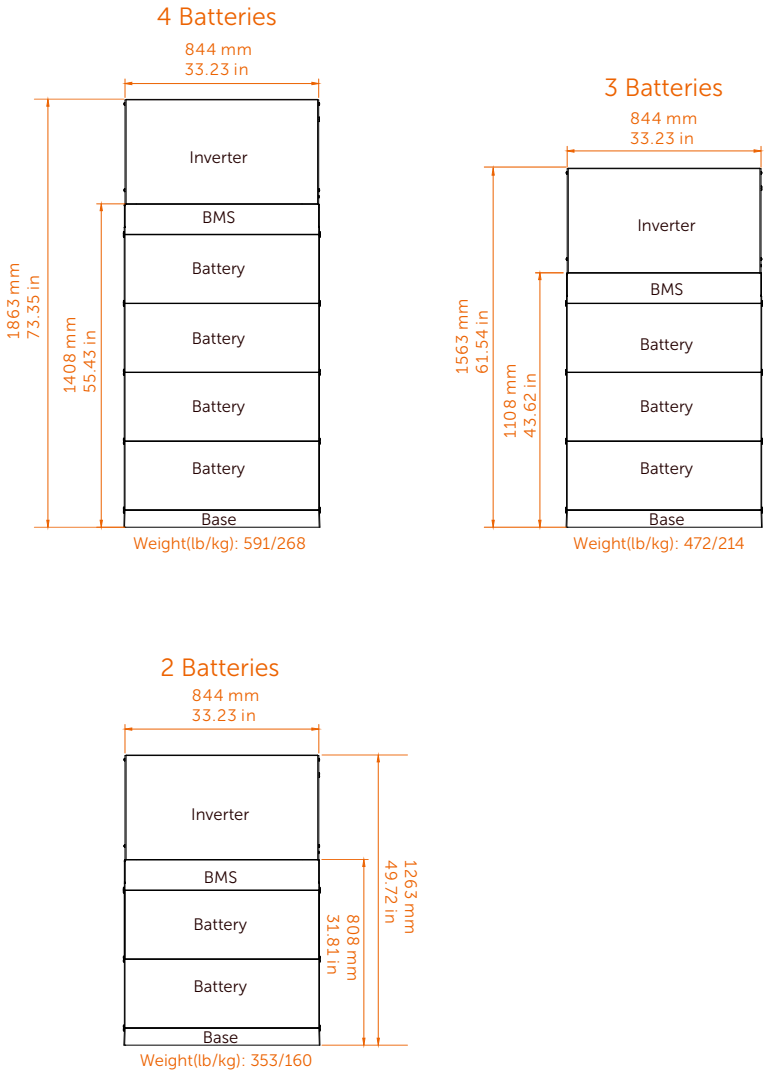
No.	Terminals	Port Pin	Type	Range	Strip Length	Torque (in-lbs)
20	CT L1B terminal	Pin 1: CT L1B+ Pin 2: CT L1B-	Shielded, twisted pair	/	/	/
21	CT L2A terminal	Pin 1: CT L2A+ Pin 2: CT L2A-	Shielded, twisted pair	/	/	/
22	CT L2B terminal	Pin 1: CT L2B+ Pin 2: CT L2B-	Shielded, twisted pair	/	/	/

BI breaker and switch (Purchased by customer)

No.	Component	Description		
		Amps	Part Number	Description
1	Grid breaker	100	CSR2100	Eaton # CSR2100: 100 A / 240 V, 25 kAIC, 2-Pole
		125	CSR2125N	Eaton # CSR2125N: 125 A / 240 V, 25 kAIC, 2-Pole
		150	CSR2150N	Eaton # CSR2150N: 150 A / 240 V, 25 kAIC, 2-Pole
		175	CSR2175N	Eaton # CSR2175N: 175 A / 240 V, 25 kAIC, 2-Pole
		200	CSR2200N	Eaton # CSR2200N: 200 A / 240 V, 25 kAIC, 2-Pole
		100	BW2100	Eaton # BW2100: 100 A / 240 V, 10 kAIC, 2-Pole
		125	BW2125	Eaton # BW2125: 125 A / 240 V, 10 kAIC, 2-Pole
		150	BW2150	Eaton # BW2150: 150 A / 240 V, 10 kAIC, 2-Pole
		175	BW2175	Eaton # BW2175: 175 A / 240 V, 10 kAIC, 2-Pole
		200	BW2200	Eaton # BW2200: 200 A / 240 V, 10 kAIC, 2-Pole
		100	BWH2100	Eaton # BWH2100: 100 A / 240 V, 25 kAIC, 2-Pole
		125	BWH2125	Eaton # BWH2125: 125 A / 240 V, 25 kAIC, 2-Pole
		150	BWH2150	Eaton # BWH2150: 150 A / 240 V, 25 kAIC, 2-Pole
		175	BWH2175	Eaton # BWH2175: 175 A / 240 V, 25 kAIC, 2-Pole
		200	BWH2200	Eaton # BWH2200: 200 A / 240 V, 25 kAIC, 2-Pole
2	Emergency stop switch	Normally closed (NC) contact The UL certification is required for the emergency stop switch.		

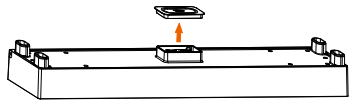
3. Mechanical Installation (Floor-mounting)

- Weight and mounting height instructions



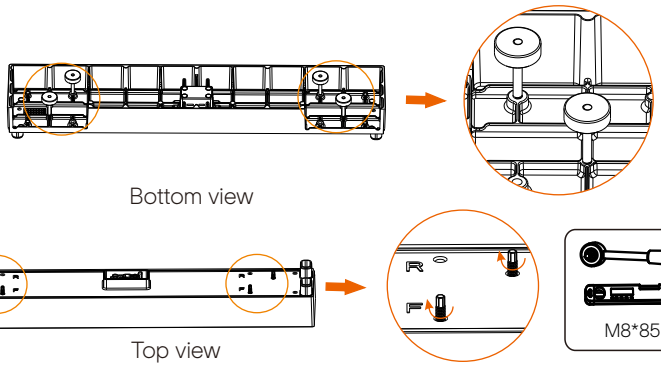
- **Mount the battery**

Step 1 Mount the base



Hand remove

1



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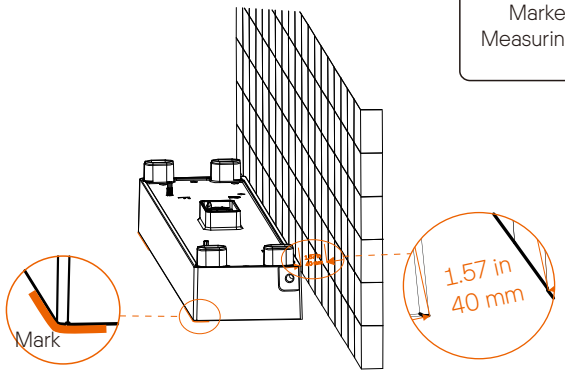
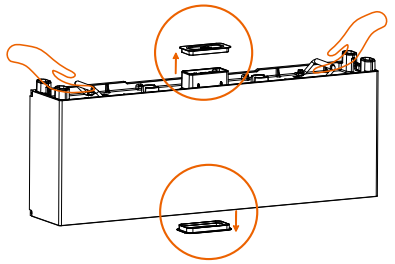


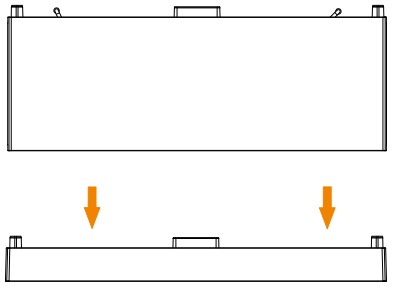
3

Step 2 Mount the battery module



Hand remove

1



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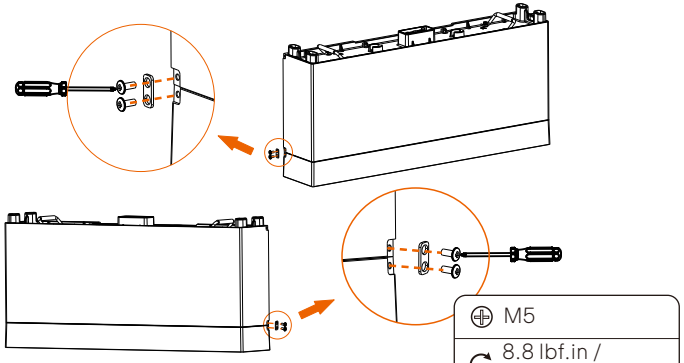

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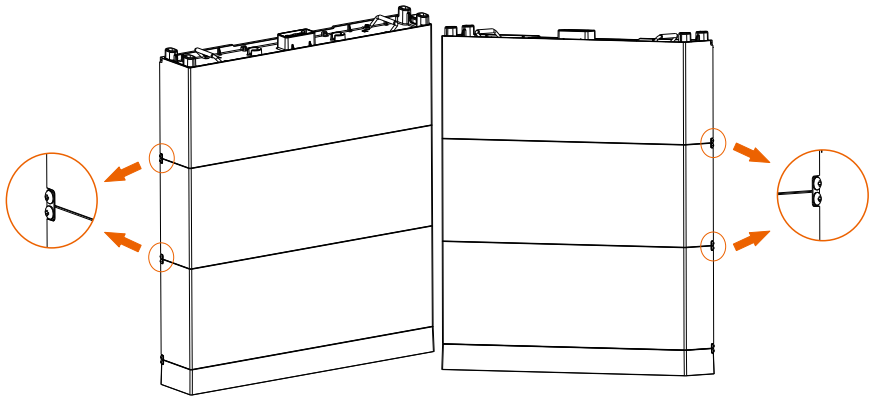
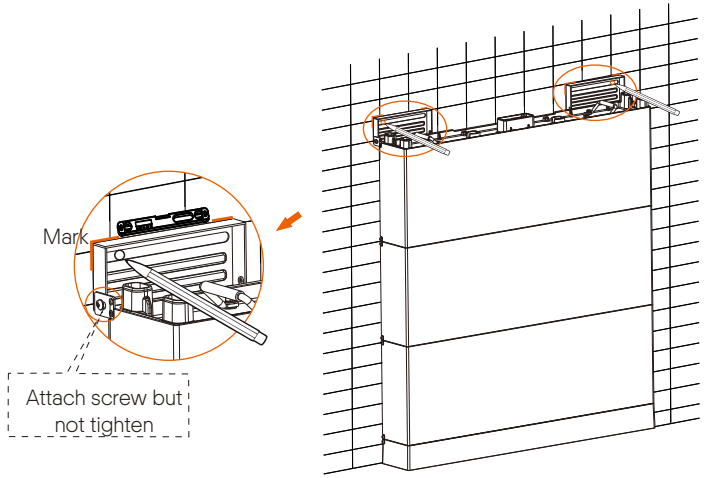
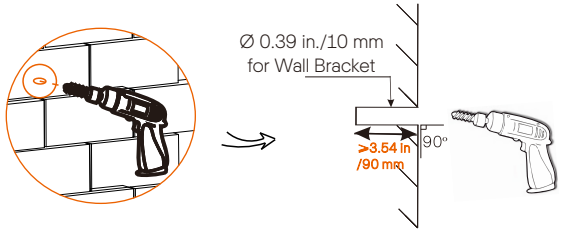


⊕	M5
C	8.8 lbf.in / 1.0 N·m

4



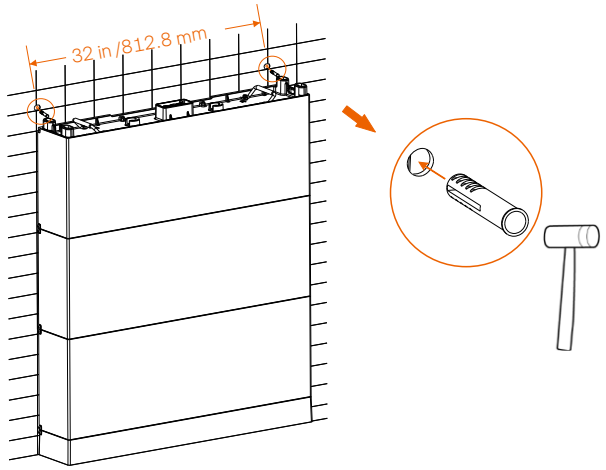
5



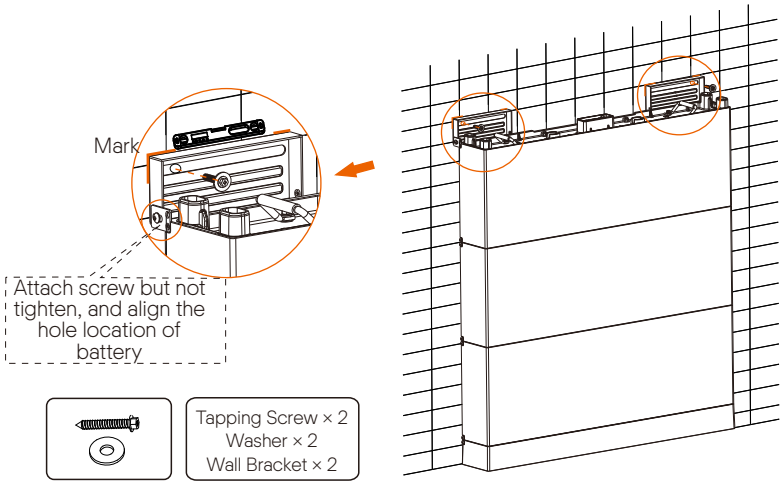
CAUTION!

Please re-mount the dust cover to the battery module before drilling holes to avoid dust falling into the interface and do remember to remove the dust cover again after the installation wall bracket completed.

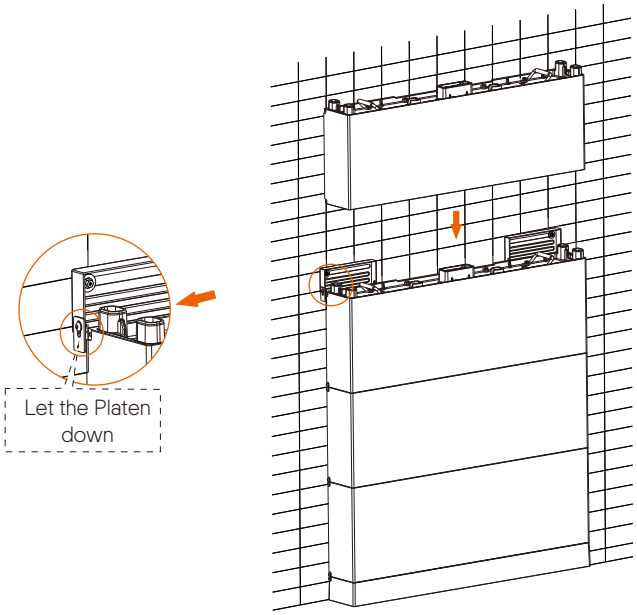
6



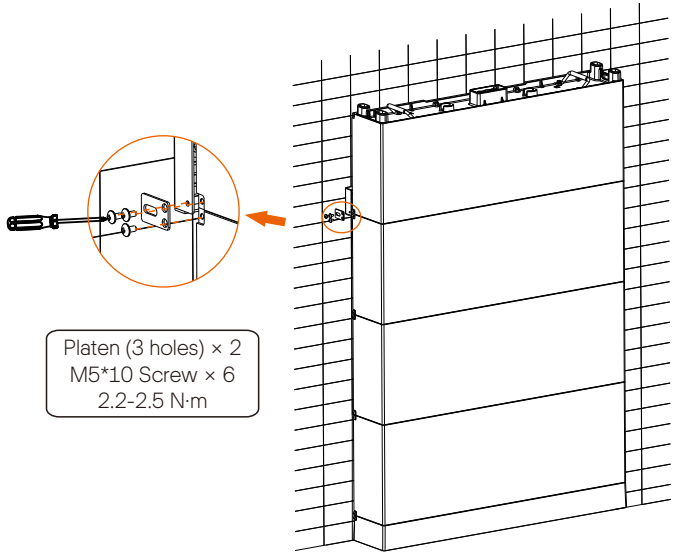
7


Mark
Attach screw but not tighten, and align the hole location of battery
Tapping Screw × 2
Washer × 2
Wall Bracket × 2

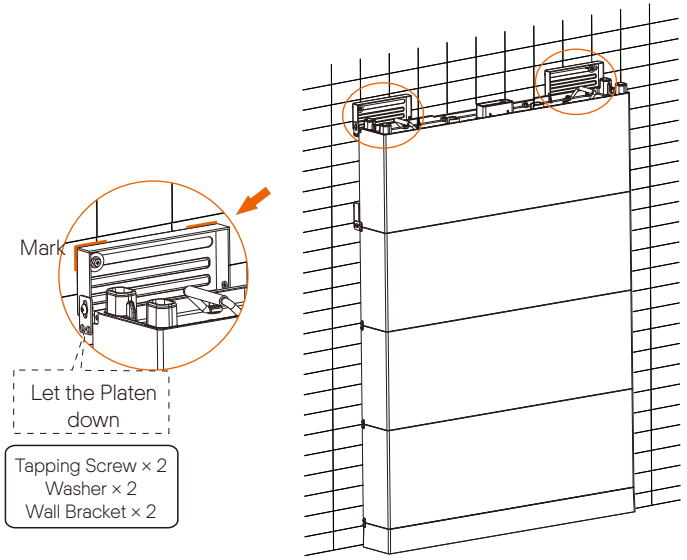
8


Let the Platen down

9

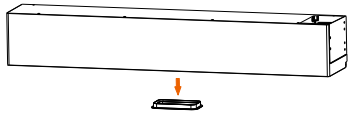

Platen (3 holes) × 2
M5*10 Screw × 6
2.2-2.5 N·m

10


Mark
Let the Platen down
Tapping Screw × 2
Washer × 2
Wall Bracket × 2

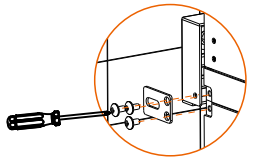
11

Step 3 Mount the BMS

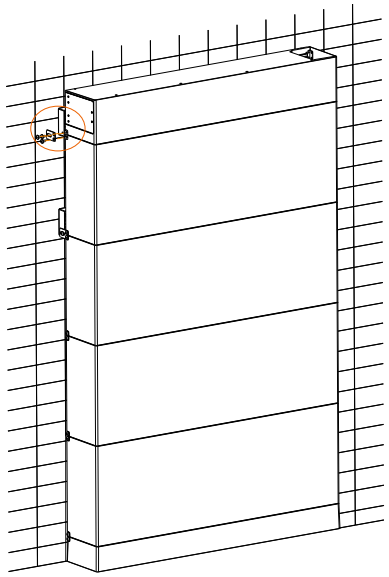


Hand remove

1



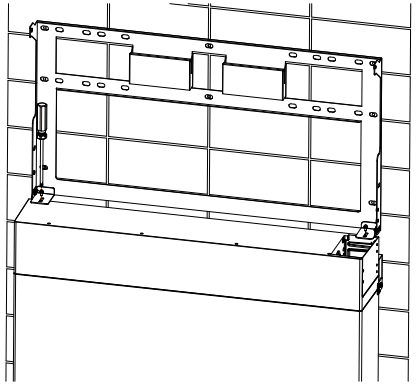
M5
8.8 lbf.in / 1.0 N·m

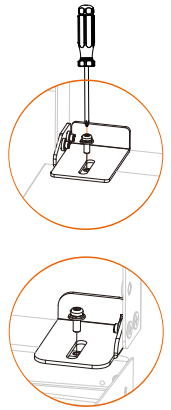


2

- Mount the inverter

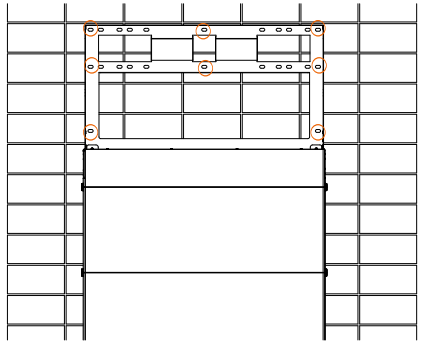
Screw in the two M4 screws, adjust the bracket to be firmly attached on the wall surface and tignen M4 screws

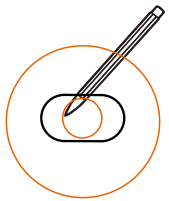




M4
4.4 lbf.in / 0.5 N·m

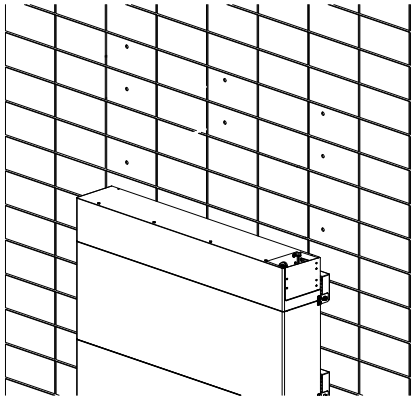
1

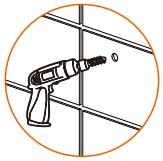




Round holes

2



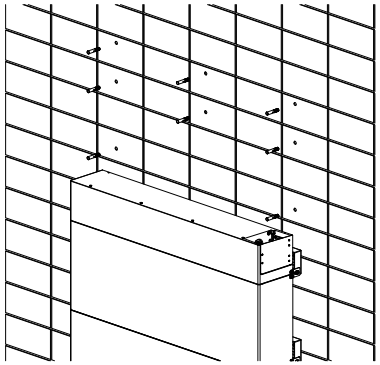


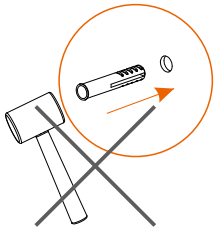
Φ4 drill for wooden wall
Φ10 drill for concrete wall
Depth:
2.16 in / 55 mm

CAUTION!

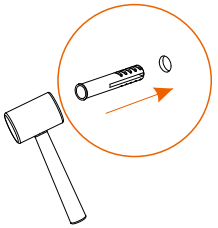
Remove the screws on the bracket and disassemble the bracket before drill holes.

3



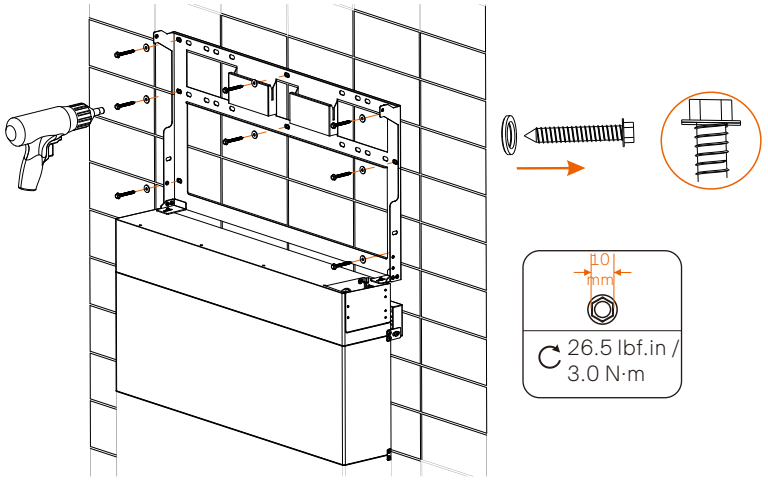


For wooden wall,
this step is not required

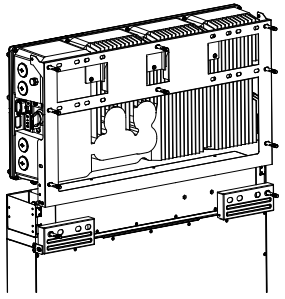


For solid concrete wall,
this step is required

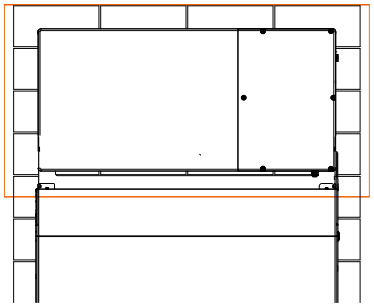
4



5

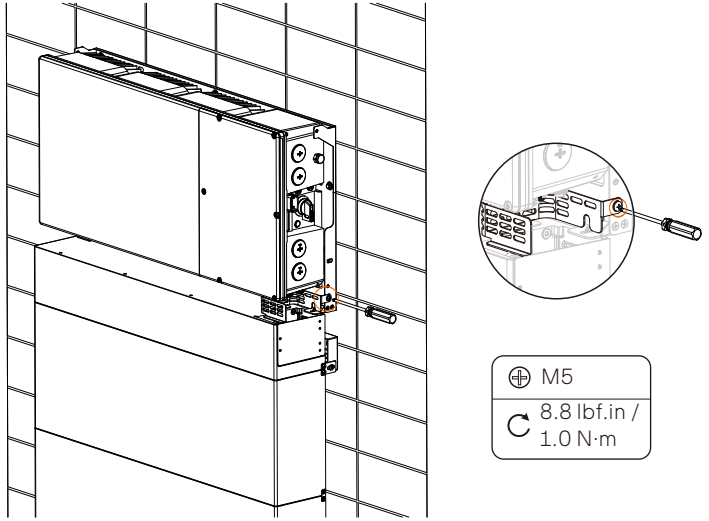


Back view

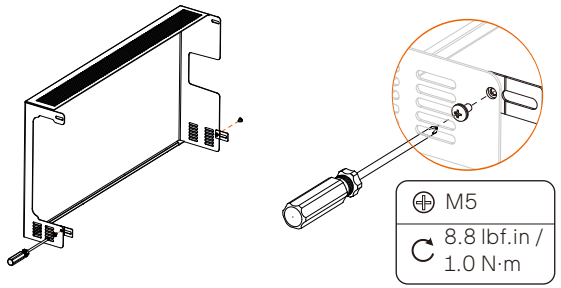


Front view

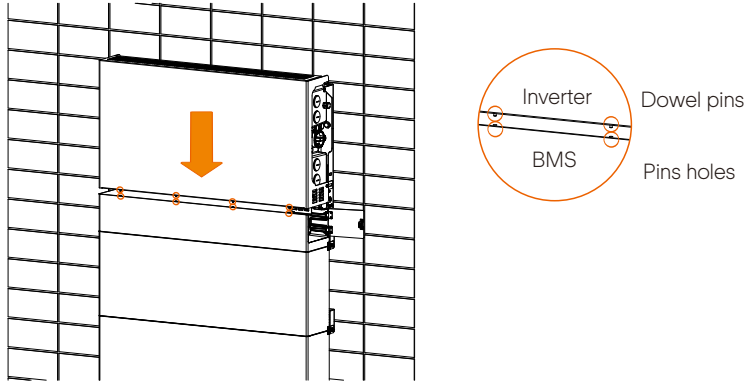
6


M5
8.8 lbf.in /
1.0 N·m

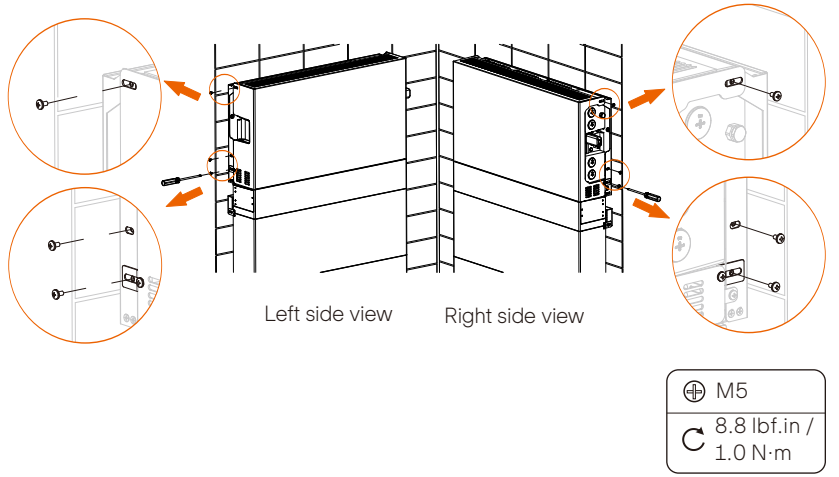
7


M5
8.8 lbf.in /
1.0 N·m

8

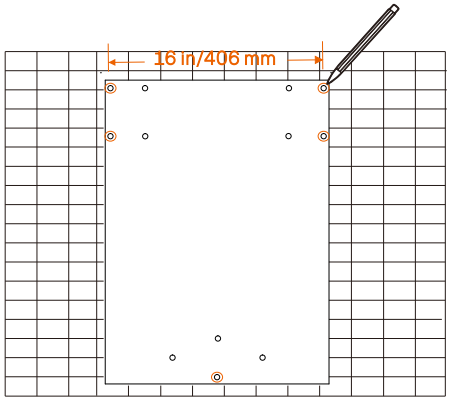

Inverter
BMS
Dowel pins
Pins holes

9

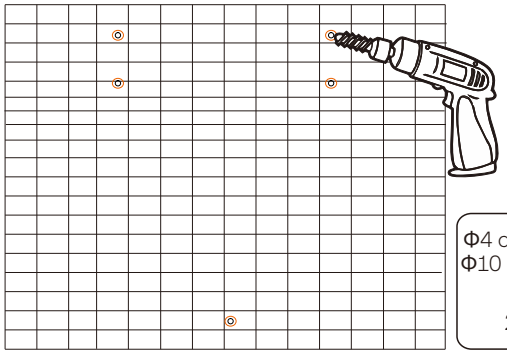

Left side view
Right side view
M5
8.8 lbf.in /
1.0 N·m

10

- Mount the BI

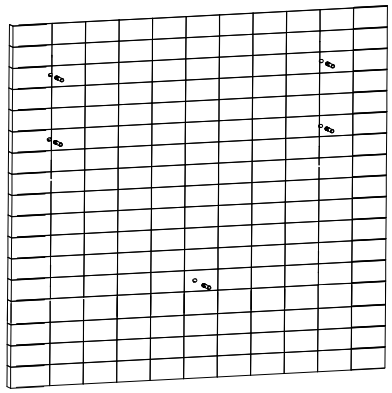


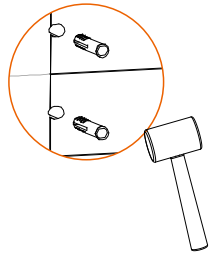
1



Φ4 drill for wooden wall
Φ10 drill for concrete wall
Depth:
2.16 in / 55 mm

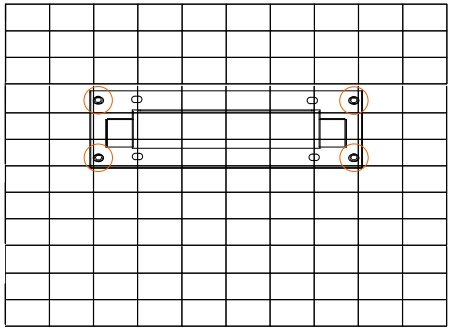
2

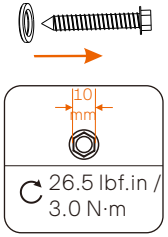




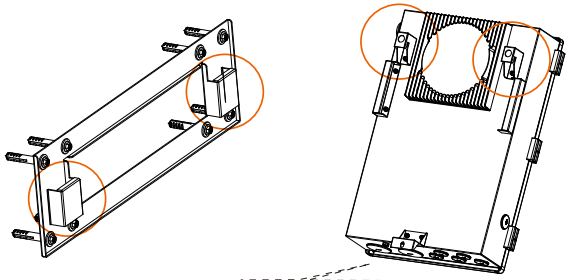
This step is not required
in case of wooden wall.

3

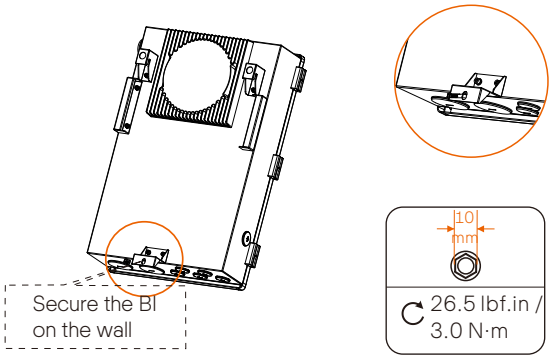




4

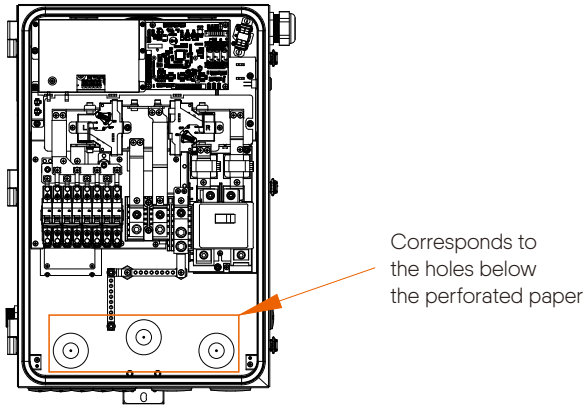


5

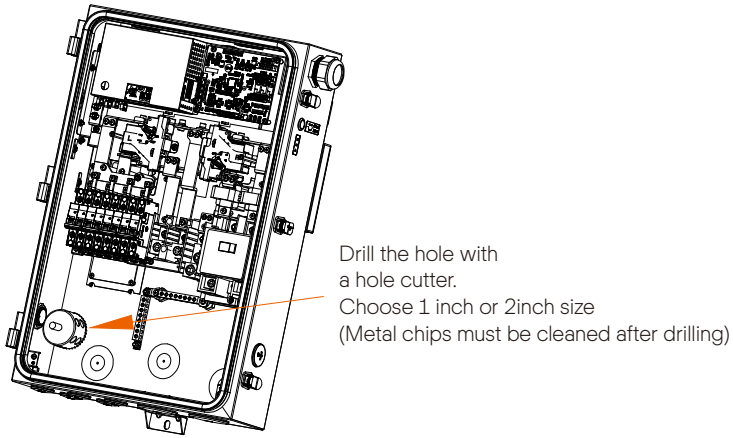


6

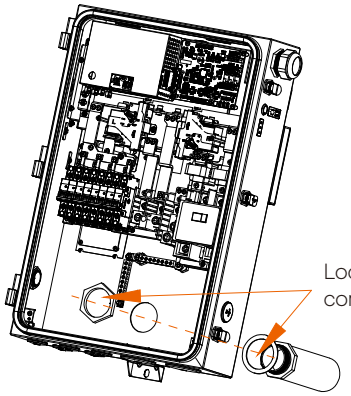
- Drill a hole in the back (Not recommended)



1



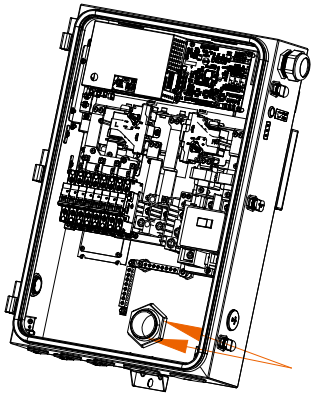
2

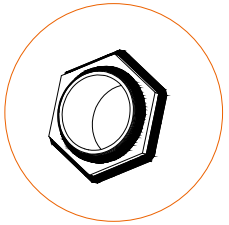


Lock nut, waterproof gasket(outside), conduit

NOTE!
Prohibit the flow of water inside the tubing water into the machine!

3



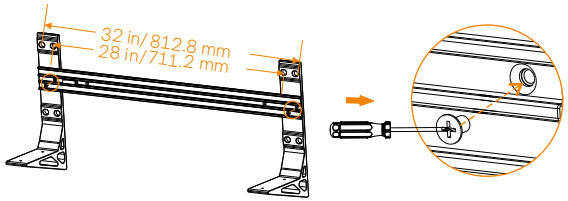


The top of the nut and contact surface of the threads must be cleaned after locking the nut, as well as the contact surface between the nut and the box.
TSE-382 waterproof adhesive or a similar performance glue.

NOTE!
Drilling a hole in the wall is required before cutting a hole in the rear. To guarantee easy installation of the conduit and sealing with the chassis, the hole's size must be greater than the conduit's outside diameter.

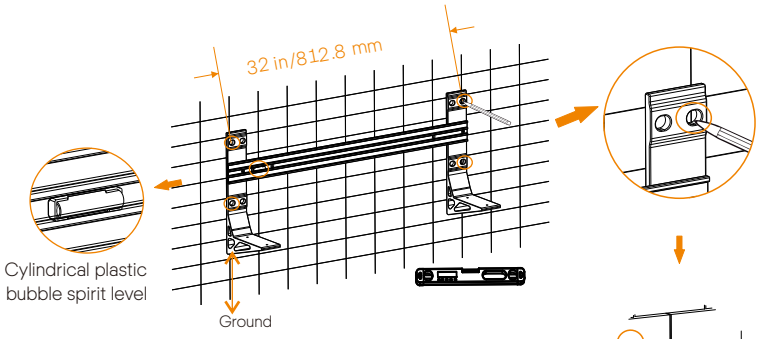
4

4. Mechanical Installation (Wall-mounting)



M5
17.7 lbf.in / 2.0 N·m

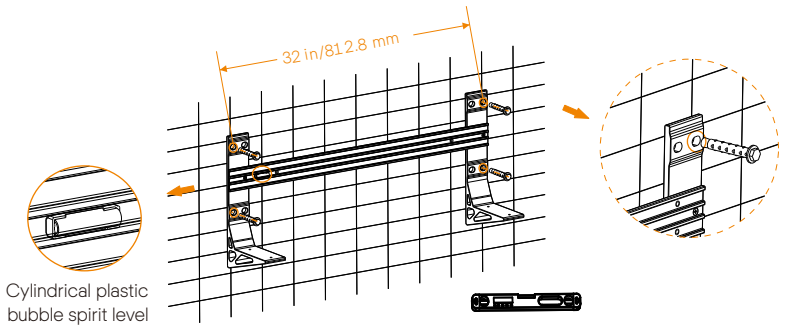
1



Note: The distance from the Base to the ground is decided according to the local regulations.

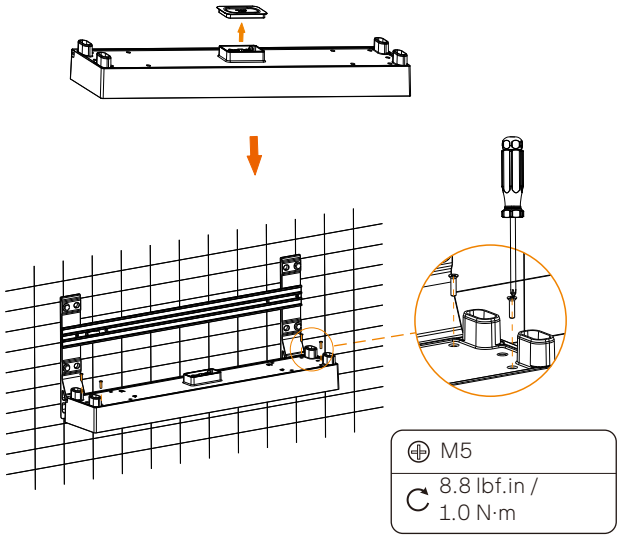
Φ8 drill for wooden wall Depth: 1.97 in/ 50 mm	Φ12 drill for concrete wall Depth: 3.54 in/ 90 mm

2



26.5 lbf.in / 3.0 N·m	
x 4 For solid wood wall	x 4 For concrete wall

3

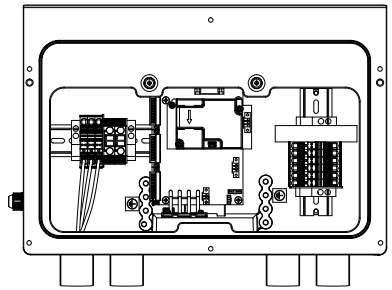


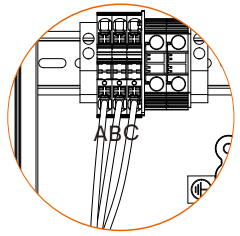
M5
8.8 lbf.in / 1.0 N·m

4 The steps of mounting battery modules, BMS and inverter are same as the floor-mounting's. Please refer to Chapter 3.

5. Wiring Connection on the Inverter

- AC cable



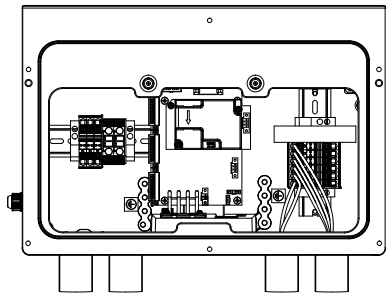


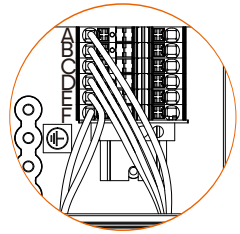
12-8 AWG(for A1-HYB-G2 3.8 KW)
10-8 AWG(for A1-HYB-G2 5.0 KW / 6.0 KW / 7.6 KW)

0.47 in / 12 mm

A: L1 terminal B: L2 terminal C: N terminal

- PV cable



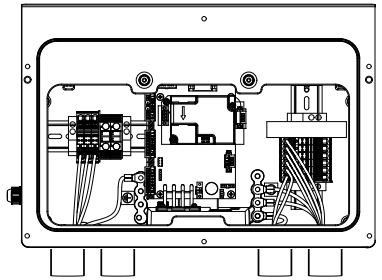


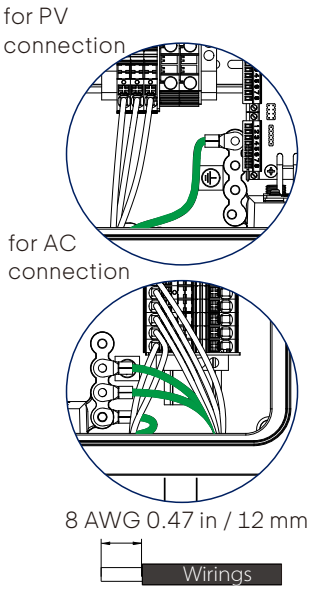
2 MPPTs(for A1-HYB-G2 3.8 KW / 5.0 KW / 6.0 KW)
3 MPPTs (for A1-HYB-G2 7.6 KW)

A, C and E: PV+ terminal
B, D and F: PV- terminal

10-8 AWG 0.47 in / 12 mm

- GND cable





- Communication cable

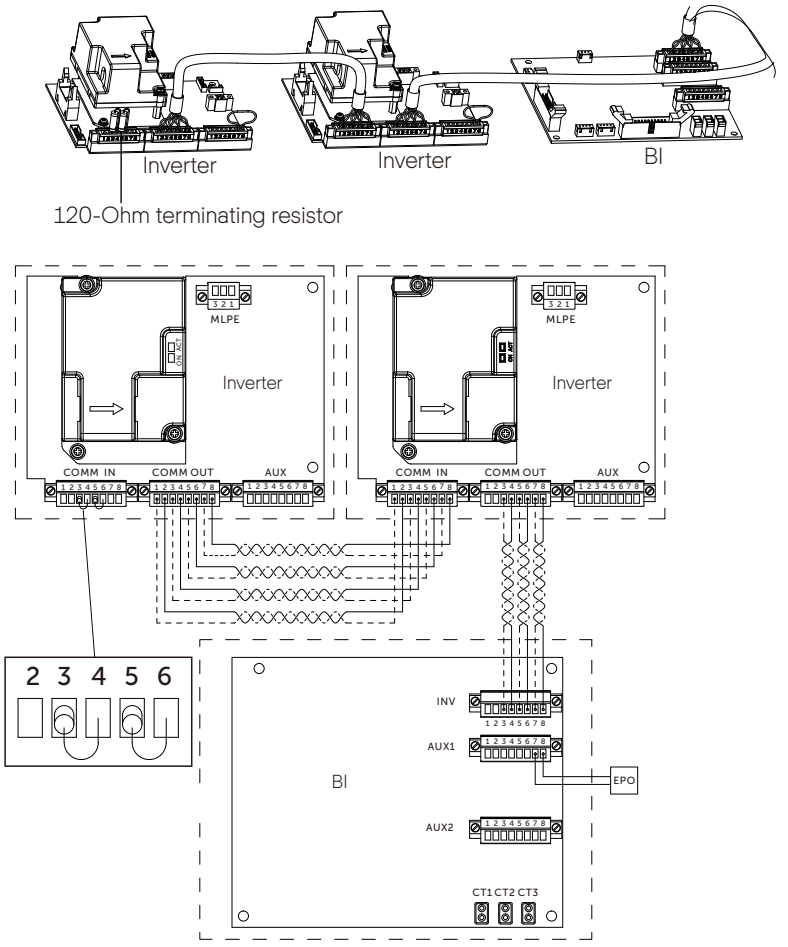
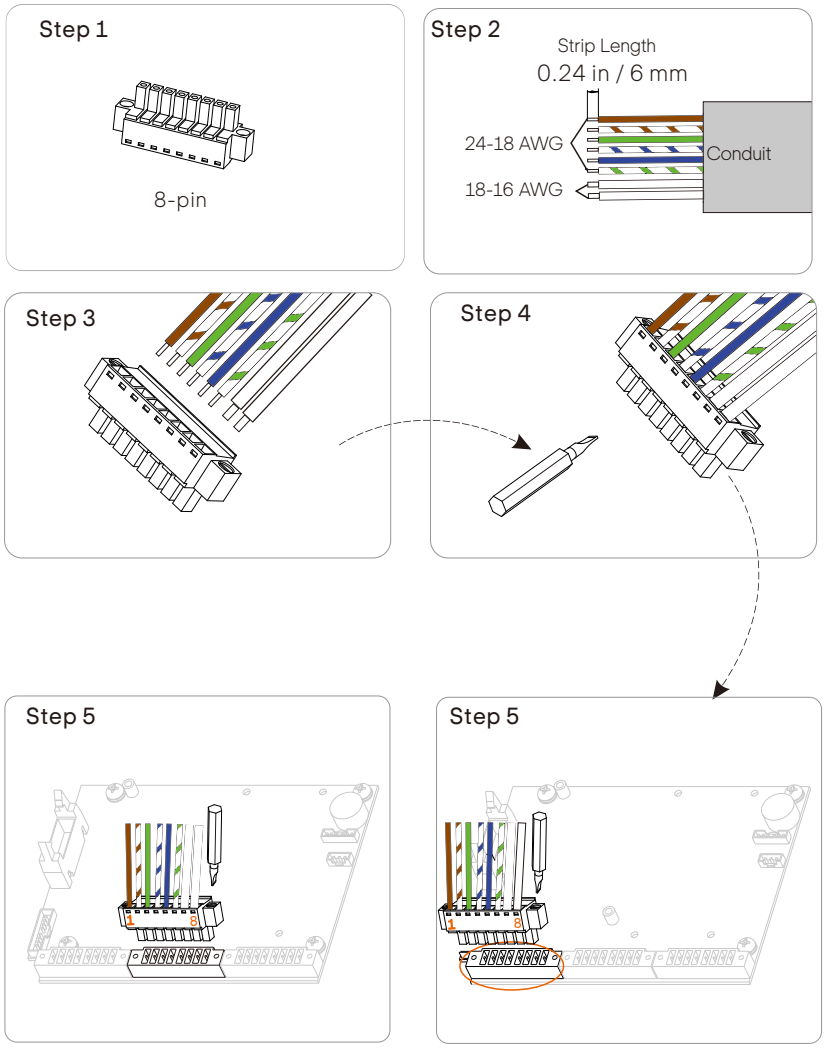


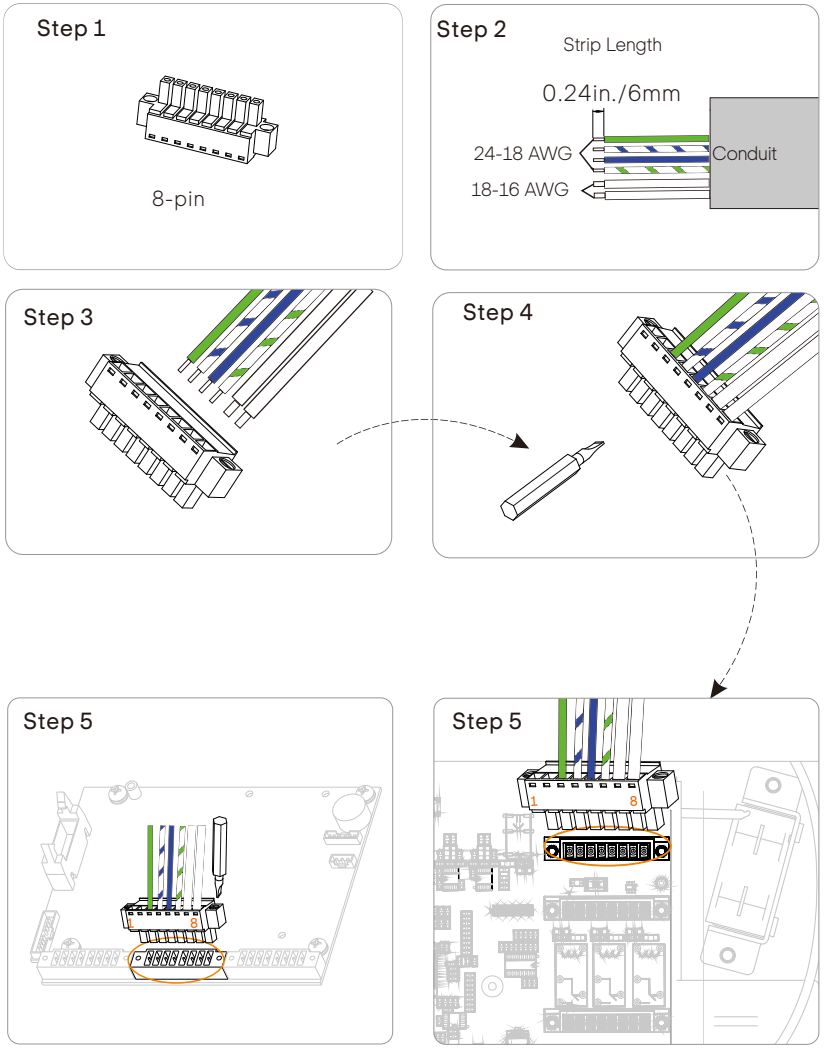
Diagram for communication connection steps between inverters



On the side of the first inverter

On the side of the second inverter

Diagram for communication connection steps between inverter and BI

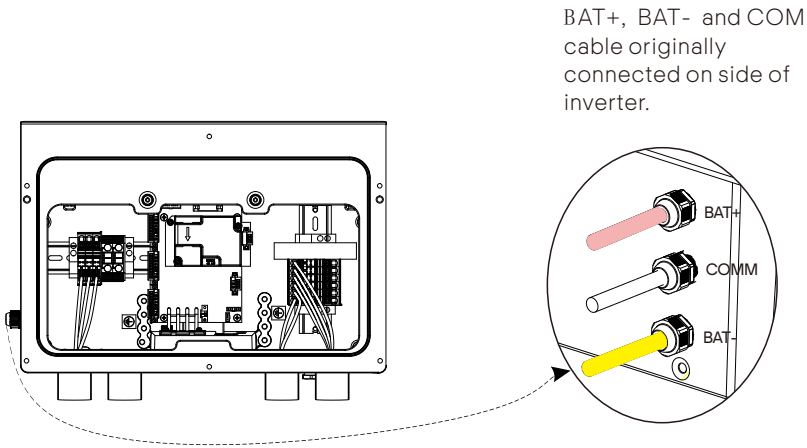


On the side of inverter

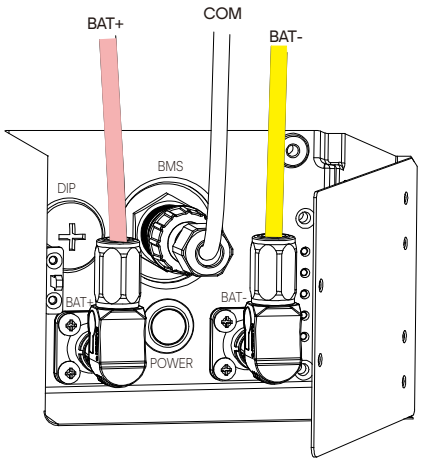
On the side of BI

6. Wiring Connection Between Inverter and Battery

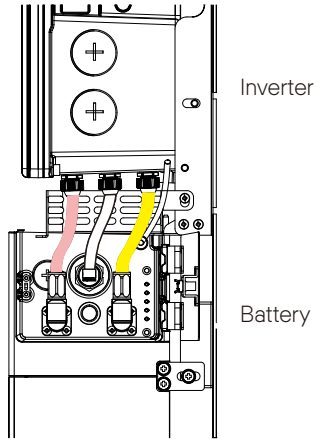
- BAT+, BAT- and COMM cable



On the side of inverter

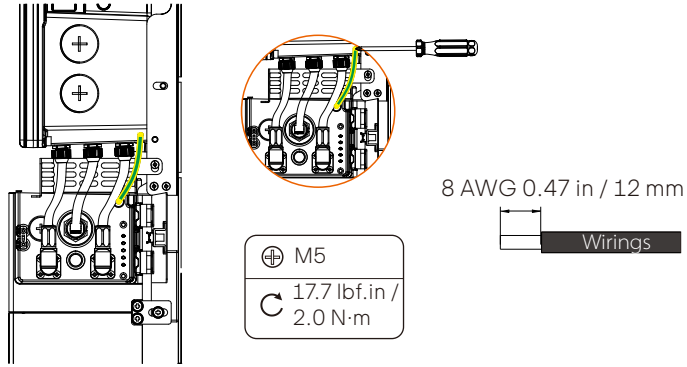


On the side of battery



Connection between inverter and battery

- GND cable

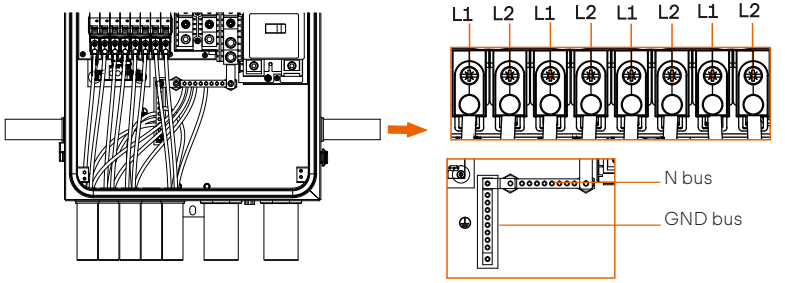


For easier connection, please connect the grounding cable on the BMS first.

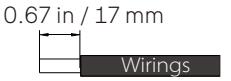
7. Wiring Connection on the BI

7.1 Connect Inverter Conductors to BI

- AC cable



12-8 AWG(for A1-HYB-G2 3.8 KW)
10-8 AWG(for A1-HYB-G2 5.0 KW / 6.0 KW / 7.6 KW)

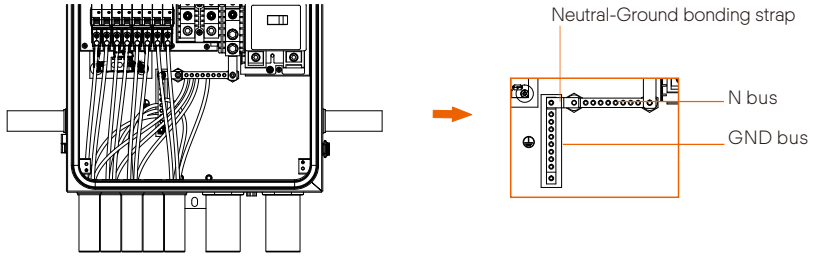


AC cable

GND cable

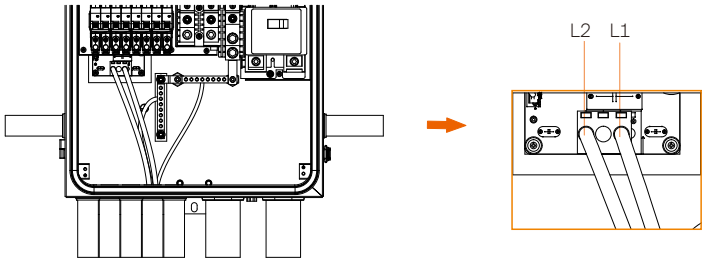
- Neutral-Ground Bonding Strap-factory installed

Remove Neutral-Ground bonding strap from BI if not installed as service equipment.
Proper earth connection and Neutral-Ground bonding strap is required for safe operation of the system and for compliance with local code requirements.



7.2 Connect Generator and EPO Conductors to BI

- AC cable of generator



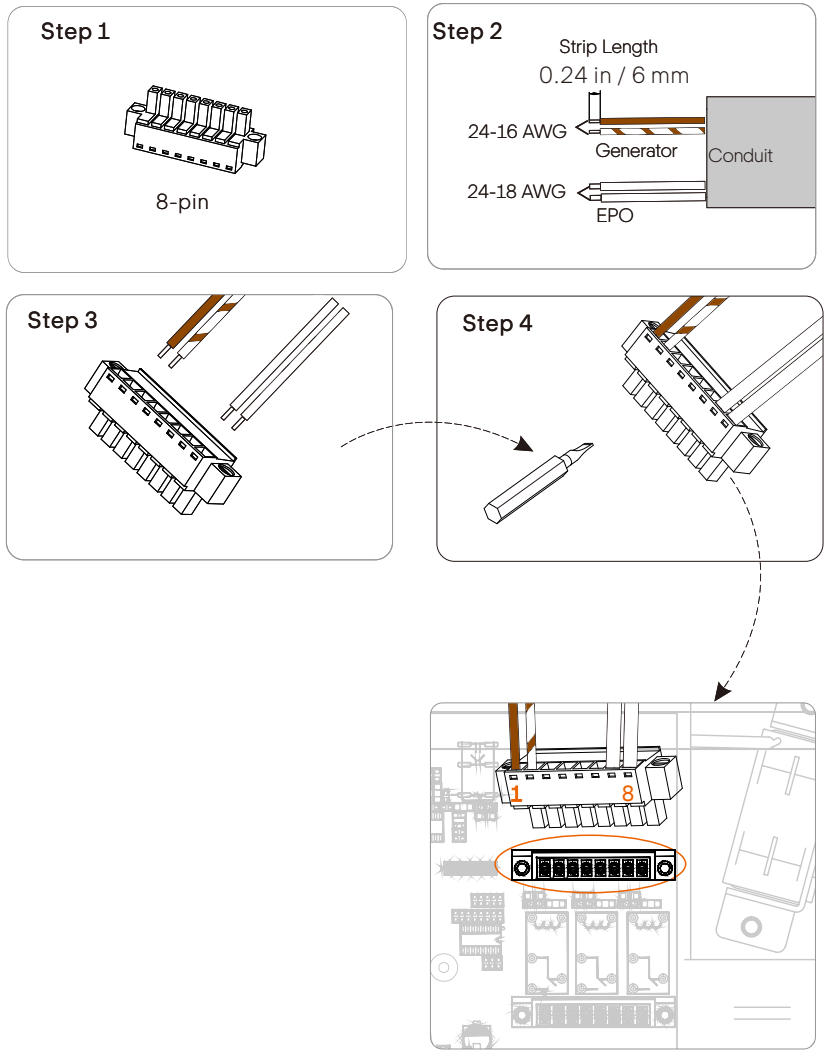
8-4 AWG 0.67 in / 17 mm

AC cable

8-6 AWG 0.79 in / 20 mm

GND cable

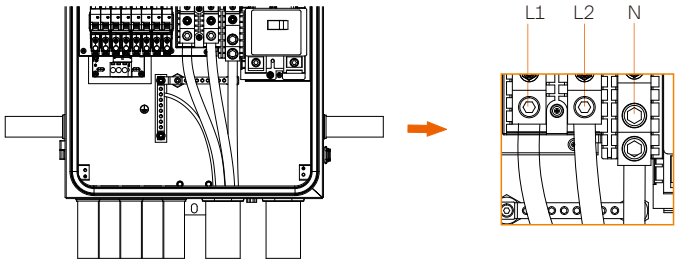
- Communication cable of generator and EPO



On the side of BI

7.3 Connect Load Conductors to BI

- AC cable



6-4 AWG 1.77 in / 45 mm

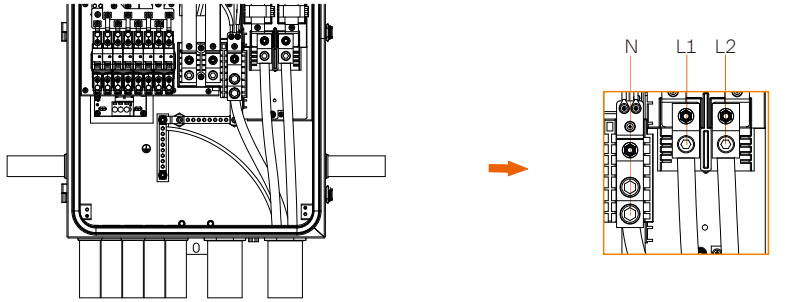
GND cable

4/0 AWG 1.25 in / 32 mm

AC cable

7.4 Connect Grid Conductors to BI

Before installing a main breaker



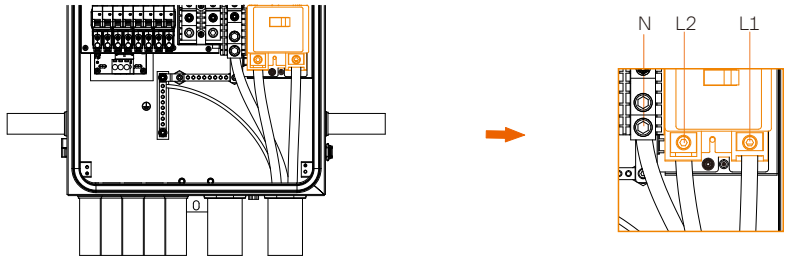
6-4 AWG 1.77 in / 45 mm

GND cable

4/0 AWG 1.25 in / 32 mm

AC cable

After installing a main breaker



6-4 AWG 1.77 in / 45 mm

GND cable

4/0 AWG 1.25 in / 32 mm

AC cable

7.5 Connect CT to BI

A set of CTs (CT L1A , CT L2A,200A) has been built in the BI. In some application scenarios ,it can measure both load and generation and there is no need to connect external CTs.But in some application scenarios,such as Partial-Home Backup solution,connecting external CTs (CT L1B , CT L2B) to measure total current both load and generation is needed. In addition,if the site includes solar equipment, a solar CT is placed after the solar inverter to measure the solar output.
CT L1A terminal and CT L1B terminal have been connected in parallel on PCB. CT L1A and CT L1B are used to measure total current both load and generation of the same phase L1.
CT L2A terminal and CT L2B terminal have been connected in parallel on PCB. CT L2A and CT L2B are used to measure total current both load and generation of the same phase L2.

NOTE!
For detailed information about how to configure external CT, please refer to “BI CT configuration for A1-ESS-G2”.